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Piccirilli 1-75

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): A.B. Piccirilli et al.  
Case: 1-75  
Serial No.: 09/262,530  
Filing Date: March 4, 1999  
Group: 2633  
Examiner: Agustin Bello

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: Laura M. Hamlin Date: June 10, 2003

Title: System and Method for Secure Multiple Wavelength  
Communication on Optical Fibers

REPLY BRIEF

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Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Reply Brief is submitted in response to the Examiner's Answer dated April 10, 2003 in the above-referenced application.

ARGUMENT

The Examiner in his Answer to the Appeal Brief filed by Applicant on January 27, 2003, reasserts his argument that each of claims 1-32 is unpatentable under either 35 U.S.C. §102(b) or 35 U.S.C. §103(a). Applicant respectfully disagrees with the assertions presented by the Examiner in the Answer, for the reasons identified below, as well as for those reasons previously set forth in the Appeal Brief.

As Applicant pointed out in the Appeal Brief, the present invention is directed to methods and systems for secure optical communication. As indicated in the specification at page 1, lines 15-22, conventional techniques for secure optical communication, e.g., those involving encryption algorithms, suffer from a number of significant drawbacks, such as additional bandwidth

requirements, computation-intensive protocols, and the need for key exchange. The present invention overcomes these problems by providing a secure optical communication arrangement in which, as described at page 2, lines 2-6 of the specification, “a bit stream constituting a message to be transmitted is divided into portions, and these portions are allocated among plural wavelength channels for transmission.” An example of the dividing of a given signal into portions can be seen in FIG. 7, where an initial data stream 215 is separated into four portions, each of which is assigned to a corresponding one of four wavelength channels denoted  $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$  and  $\lambda_4$ . As described in the Appeal Brief, an important advantage provided by the particular claimed arrangements is enhanced security of communication, because the particular pattern of allocation of signal portions to wavelength channels is not readily determinable by an unauthorized user.

The Examiner argues with regard to independent claim 1 that such an arrangement is anticipated by U.S. Patent No. 5,710,650 (hereinafter “Dugan”). The Dugan reference is also utilized by the Examiner as an anticipation reference or primary obviousness reference in the rejection of each of the other claims 2-32. However, Applicant respectfully submits that the Examiner is mischaracterizing the Dugan teachings, in that Dugan fails to teach or suggest the assignment of different portions of a given data signal to different wavelength channels for modulation onto corresponding optical carriers in a manner that provides the enhanced security advantages noted above.

The Examiner relies on statements in Dugan to the effect that a high-speed OC-192 signal at 10 Gbps is “partitioned” into four equal OC-48 signals each at 2.5 Gbps. Applicant respectfully submits that this well-known conventional partitioning of a high-speed OC-192 signal into four different OC-48 signals cannot reasonably be characterized as anticipatory of the assigning of different portions of a given data signal to different wavelength channels as set forth in claim 1. With reference to the above-noted example in FIG. 7 of the present specification, it can be seen that the claimed assignment assigns actual portions of the initial data stream signal 215 to each of the four wavelength channels denoted  $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$  and  $\lambda_4$ . In other words, the signal characteristics of a given assigned portion correspond exactly to those of the associated part of the original data signal 215, not only in terms of the data content but also in terms of the bit rate. This is not the case in the Dugan reference, where the four equal OC-48 signals constitute different signals at a lower bit rate,

and do not constitute actual portions of the high-speed OC-192 signal at the higher bit rate. Although the particular data bit values that are present in each of the OC-48 signals are also present in the OC-192 signal, the OC-48 signals represent a fundamentally altered version of the original higher bit rate signal in that the bit rate of each of the OC-48 signals is lower than the bit rate of the OC-192 signal. Therefore, actual portions of the higher bit rate OC-192 signal, having the same data content and bit rate, are not present in the OC-48 signals. In the FIG. 7 example of the claimed arrangement, as referred to above, the assigned portions comprise actual portions of the data signal 215.

The point which Applicant is making is a subtle one, but nonetheless an important one in terms of providing the enhanced security advantages of the claimed invention. By assigning portions of the data signal itself to different wavelength channels, the particular pattern of allocation of signal portions to wavelength channels is not readily determinable by an unauthorized user, and additional security is provided. Such security is not provided in the Dugan partitioning, because each of the OC-48 signals represents a stand-alone signal that can be separately processed without any knowledge of the OC-192 signal from which it is generated.

The Examiner in the Answer makes an analogy to a sliced sandwich. With reference to the FIG. 7 example of the claimed arrangement, it can be seen that the assigned portions of the data signal 215 are indeed like "slices" of the signal 215 in that the signal characteristics of a given slice, including both the data content and the bit rate, are the same in the given slice as they are in the original data signal 215. The analogy breaks down, however, when applied to Dugan. In Dugan, if the OC-192 signal is viewed as a sandwich, as proposed by the Examiner, the OC-48 signals are not properly viewed as slices of that original sandwich. This is because they differ in at least one signal characteristic, namely bit rate, from the original signal from which they are derived. Therefore, the OC-48 signals are more properly viewed as different sandwiches that are prepared by taking the contents of the original OC-192 sandwich, discarding the bread, dividing the contents into four separate pieces, and making four new but smaller sandwiches from the divided contents using different bread. The analogy offered by the Examiner thus actually supports the arguments presented by Applicant.

In view of the foregoing, Applicant submits that Dugan fails to teach or suggest the particular limitations of independent claim 1. The above-described mischaracterization of the Dugan teachings is carried over into the rejections of the other claims, and these rejections are believed to be similarly deficient in terms of their reliance on Dugan.

For the reasons identified above and in the previously-filed Appeal Brief, Applicant respectfully submits that the § 102(b) and § 103(a) rejections are improper and should be withdrawn.

Respectfully submitted,

A handwritten signature in black ink, reading "Joseph B. Ryan". The signature is fluid and cursive, with the first name "Joseph" and last name "Ryan" clearly legible. The middle initial "B." is smaller and less distinct.

Date: June 10, 2003

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Sir:

Submitted herewith are the following documents relating to the above-identified patent application:

- (1) Reply Brief in triplicate (original and two copies).

It is believed that there is no additional fee due in conjunction with the response. In the event of non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit **Ryan, Mason & Lewis, LLP Deposit Account No. 50-0762** as required to correct the error. A duplicate copy of this letter and two copies of the Reply Brief are enclosed.

Respectfully submitted,

Date: June 10, 2003

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